

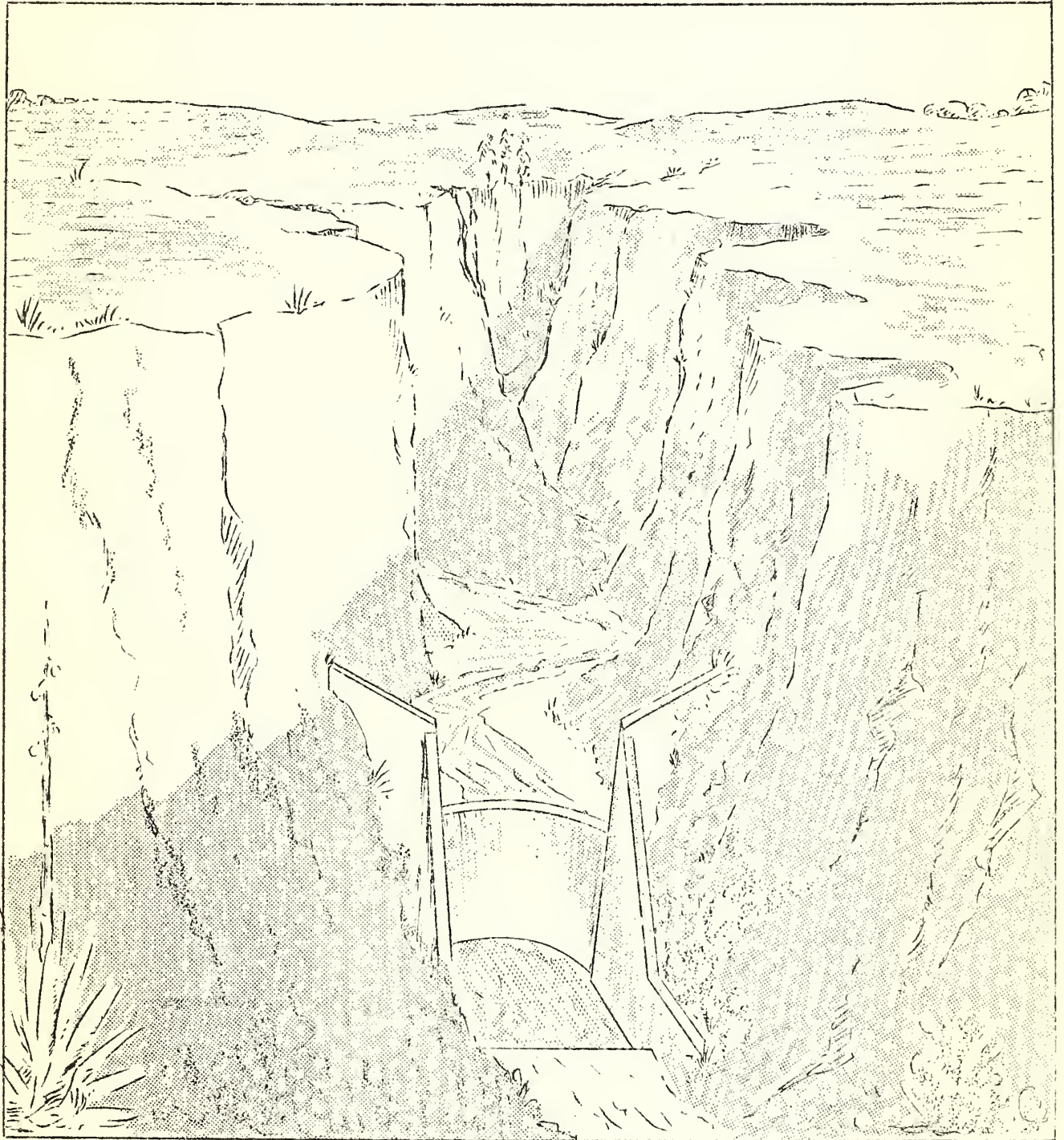
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SOIL CONSERVATION SERVICE
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RESTORING THE BALANCE

-by-

Charles W. Petit, Assistant Regional Director

Under natural conditions a balance normally exists between soil, rainfall, slope and vegetation. Erosion losses under these conditions are generally equalized by the formation of new soil. In regions of heavy rainfall the vegetation ordinarily is sufficiently dense to protect even the steeper slopes, while in the desert the sparse vegetation may offer little or no resistance to the infrequent, but usually torrential, storms. When the soil is broken up by cultivation and this natural balance is disturbed erosion is accelerated far beyond the rate of soil formation.

Given a sufficient period of time, Nature may restore the balance and eventually heal the scars of erosion. It is economically necessary, however, that much of the land now in use continue to produce commercial crops.

In order to restore the balance and retain the profitable crops, the Soil Conservation Service is demonstrating advantageous changes in cultivation practices and in slope factors. Wherever possible the income types of vegetation are retained; only as a last resort is the land returned to native grass and brush. The land surface can be varied in several ways. Both hole-digging and contour furrowing retard surface run-off, holding the water on the soil for longer periods and increasing the amount absorbed. Contour subsoiling likewise increases the water-absorbing capacity of a soil by shattering the impervious plowpan and permitting the water to pass more rapidly and deeply into the subsoil.

Although the slope of a field cannot be greatly modified, except over very small areas, it is possible to reduce the accelerating effect of slope by shortening the unbroken run of water. This can be accomplished by means of ridges or terraces, if the soil is permeable. On less permeable soils, and on steep slopes, contour ditches should be used. In orchards, planted on the contour or a slight grade, relatively flat bench terraces are developed along the tree rows, leaving the steep risers protected by vegetation.

In ditches and gullies the grade can be reduced and cutting prevented by means of dams. In some cases it may be possible to lead drainage ditches downhill in a series of zig-zags thus reducing the grade of the ditch to 2 or 3 percent. Each turn in the ditch would have to be protected by a structure to get the water around the bend without cutting.

The planting of a close growing, high income crop offers the best solution to the problem of controlling runoff. No such crop, combining these two qualities, has as yet been found for the Las Posas area. It has become necessary, therefore, to use some substitute measures. The expanse of clean-cultivated ground may be broken by strips of close growing vegetation. These strips reduce the velocity of the run-off and collect the silt washed from the clean-cultivated portions of the field. In the Las Posas area, where irrigation is available, it is possible that close growing cover crops may be planted after the beans have been harvested.

Cover crops are now used in orchards during the greater part of the rainy season, providing protection from soil washing and adding humus to the soil when plowed under.

Most steep slopes, and even some lesser slopes of very erosive soils, should be removed from cultivation and used for pasture or wood lot. If proper range management and forestry practices are followed the land will produce some income as well as checking the erosion loss. In addition to protecting the land taken out of cultivation this procedure will also protect lower lying lands from ruinous depositions of coarse and barren material.

The above are a few of the measures by which the Soil Conservation Service is restoring the balance between run-off, slope and vegetative cover.

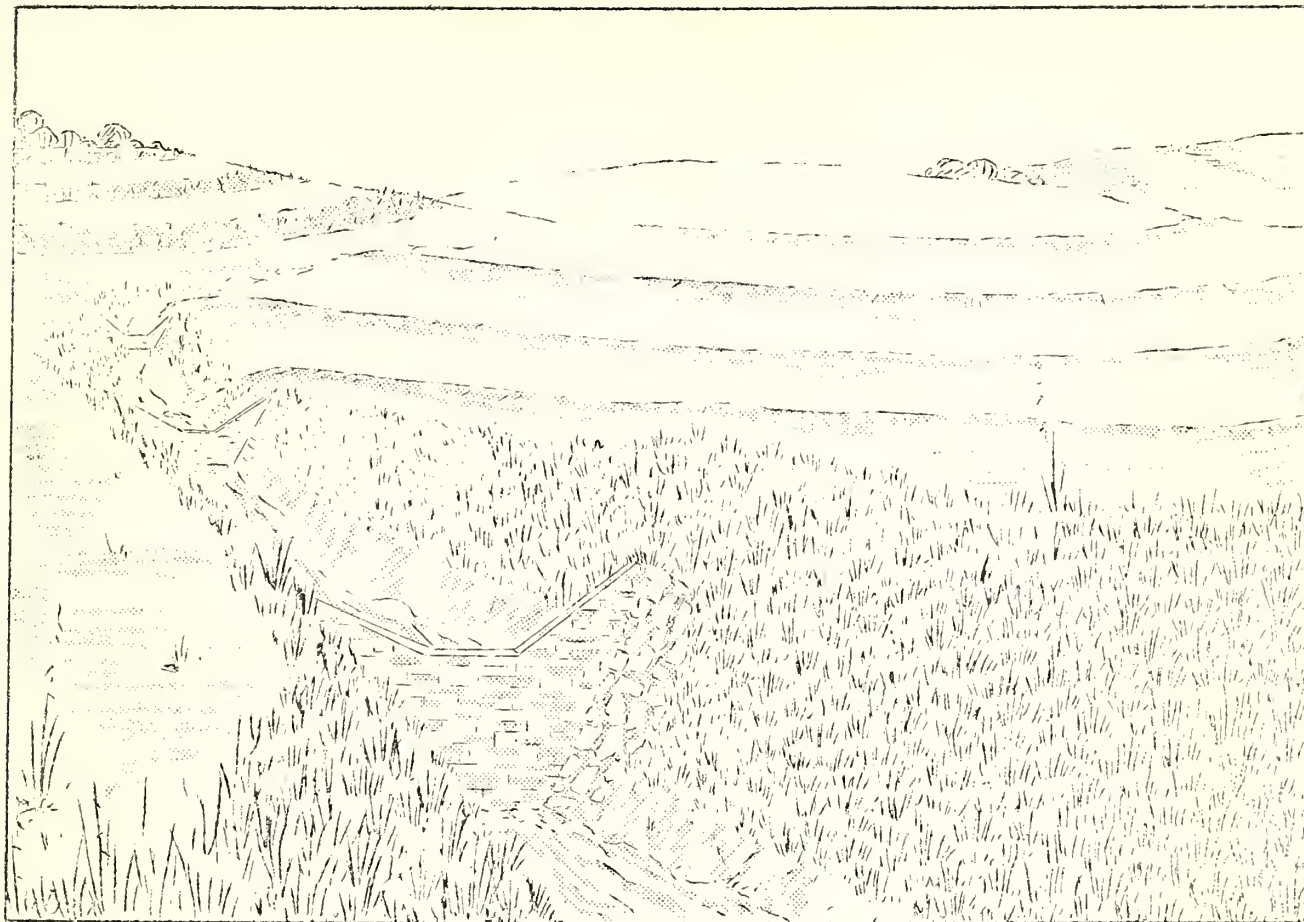
ECW CAMP AT EL TORO TO BE COMPLETED AUGUST FIRST

The Emergency Conservation Work Triple-C camp at El Toro in Orange County, which is one of the twelve camps in California assigned to the Soil Conservation Service, is rapidly nearing completion and August first is the date tentatively set for hammering the last nail, according to word from camp commander Captain W.M. Thomas. The camp is located one mile north of El Toro just off of El Toro Road.

Lieutenant Norman Dole, construction engineer of the U.S. Army, is in charge of the building program. Eight barracks, interiors walled with an insulating material, a double-floored dining hall, and concrete floored and plastered kitchen have been completed. In addition there will be built two garages, tool house, oil house, truck dispatcher's office, and a blacksmith shop. To give the buildings a spick-and-span appearance all exteriors will be painted white. The driveway leading to the camp will be lined with 150 palm trees donated by a public-spirited individual.

To Major Walton, of March Field, district commander of the ECW camps east of Upland will go the appreciation of the personnel for a comfortable camp.

Horace R. McConnell, assistant state administrator in charge of the ECW camps in the southern part of the state assigned to the Soil Conservation Service and Walter W. Bauer, superintendent of El Toro camp are developing plans for erosion control measures recommended by members of the SCS staff and to be undertaken by enrollees upon arrival. Enrollees in this camp are made up of war veterans whose former ratings range from buck private to Lt. Commander in the Navy. This camp will be a home for these men and the quality of the accommodations should make their life at El Toro Camp very pleasant.



WORK TYPICAL OF THE ARROYO GRANDE PROJECT

In the foreground is a masonry stabilizing dam which, with the two other dams farther up to the left, is preventing cutting in the bottom of the gully. The banks have been stabilized by planting various combinations of oats and Western Rye Grass. Other plants used are bur clover, Lespedeza, and a few native grasses. Elymus (Giant Rye Grass) and Mesembryanthum (Ice-Plant) are often used around and above the dams.

In the upper left hand corner is a field controlled by strip crops, and in the center is a field protected by grade ditches. The outlets from these ditches enter the gully just above the dams in order to prevent cutting in the banks and bottom.

SOILS OF THE MORO COJO SERIES
As Mapped In The
CORRALITOS PROJECT #31

-by-

Logan S. Carter
Assistant Soil Expert

Since the beginning of the erosion survey in the Corralitos Project a large number of soil series, with their respective soil types, have been classified and mapped. One of the more extensive of these, the Moro Cojo series, is here discussed from the standpoint of its characteristics, origin, topography, fertility, utilization, erosivity, and recommended soil management practices.

General Description

Surface soils of the Moro Cojo series are dull brown, dull reddish brown or grayish brown in color, coarse textured and low in organic matter. The subsoils are lighter colored than the surface soils, similar in texture, with little accumulation of clay. Small areas have been mapped in which there is a distinct clay accumulation in the subsoil and a moderate compaction. At a depth of from six to eight feet the subsoil rests on a partially consolidated or softly cemented substratum of sandy material. Numerous outcrops of this hardpan-like material occurs where erosion has been very active. Numerous iron cemented pellets or concretions derived from the weathering of the hard layer during the process of soil formation and development are found throughout the soil profiles. These soils are usually distinctly acid in reaction. Drainage is good to excessive, due to the porous nature of the soil and the comparatively steep slopes on which they are found. While loamy sand and sand types predominate, some eroded areas of exposed fine textured subsoil are mapped as sandy loams and loams.

Origin

The parent material from which these soils are derived consists of a wide variety of rock of undetermined origin, laid down as softly cemented or partially consolidated sedimentary coastal-plain deposits. Close observation of the sand particles reveals their rounded character, evidencing considerable movement by water.

Topography

Soils of the Moro Cojo are found on rolling to hilly lands of moderate to steep slopes. In places long, steep ridges give way to rough, mountainous land with narrow drainage ways.

Fertility

Under virgin conditions Moro Cojo soils are of fair to medium fertility; under continued cultivation fertility is rapidly depleted, due to the excessive leaching and to the removal of the surface soil by erosion. Evidence of decreased fertility after several years of cultivation is shown by lower crop yields, greater difficulty in growing a satisfactory winter cover crop in orchards, and by the marked response of crops to fertilization.

Utilization

In the Corralitos Project, the cultivated areas of Moro Cojo soil are planted mainly to apples and to apricots, with a minor portion in grain, potatoes and pasture. Due to good air and water drainage these soils are well adapted to fruit growing. The uncultivated lands have a cover of oak, manzanita, eucalyptus, wild lilac and several species of low growing shrubs.

Erosiveness

Sheet erosion has been very active in removing the valuable surface soil. The single-grain structure of the Moro Cojo soil--resulting from the gradual loss under continued cultivation of the cohesiveness of the individual particles, and the consequent destruction of the soil aggregates--facilitates the movement of soil particles by moving water in these soils. In many parts of the area all of the surface soils and part of the subsoil has been lost by sheet erosion. Gully formation has been less active in these soils than has sheet erosion, but both have had important parts in reducing land values.

Soil Management Practices

Due to the relatively low fertility, the low organic matter content and the difficulty encountered in growing soil-saving crops during the rainy season, it is recommended that all manures available be used on Moro Cojo soils. These should be supplemented with commercial fertilizers to establish vegetative cover during the season of greatest erosion activity. Badly eroded areas on excessively steep slopes should be planted to sod-forming grasses and retired from cultivation.

WILLOWS USED IN GULLY CONTROL IN LAS POSAS

In gullies or channels which meander a system of willow planting used in the Las Posas and appears to be a practical solution for bank protection. A double row is planted along each side of the desired channel, and the "bays" planted solid to cuttings. In addition to willows, trees suitable for this type of planting are: cottonwood, black walnut, sycamore, tamarisk, athel and water moty. Other trees which grow readily from cuttings may also be used.

PLANTS FOR USE AS STRIP CROPS

Strip cropping in California requires a crop that will start promptly with the first light rains of autumn and make a rapid early growth. Small grains are preferable for this purpose. It is generally good policy to mix a legume with them, especially *Medicago hispida* (bur clover), or *Melilotus indica* (bitter clover). Vetch, *Melilotus alba* (white sweet clover), alfalfa, and Horse beans may also be used in some mixtures.

Before definite recommendations can be made as to the best time for planting and the most satisfactory mixtures for use in strip cropping, specific information must be had as to soil type, slope, exposure, and other features of the site circumstance. On poor or depleted soils the use of fertilizers will often be necessary in order to obtain the early start and the rapid growth essential to protect the surface soil from the heavy winter rains.

SOILS IN CONNECTION WITH GRADE DITCHES

The character of the soil is of great importance in determining the proper gradient for grade ditches. Some sandy soils commonly require a grade of 4 to 5 percent. The coarser sands may be rolled down the slopes by the runoff water, without true suspension. If, when they reach the ditch the velocity of flow is sufficiently reduced, movement of these coarser particles ceases abruptly and the ditch quickly fills up.

The clays and other fine particles of soil, such as are present in a normal clay loam, on the other hand may be held in true suspension by the water, and will not settle out in ditches having grades as low as 1 1/2 or 1 percent. If, however, there is an appreciable amount of the larger particles in such a clay loam, the grade must be increased to 2 percent or more.

As a ditch usually crosses more than one type of soil some compromise is usually made among the grades suitable to each of the various types of soils. The grade in all cases, should be sufficiently steep to prevent silting and yet not so great as to cause any considerable amount of scouring or bottom cutting.

To determine the position and spacing of ditches, the soil type in relation to the slope must be considered. On deep, permeable soils the ditches may be spaced farther apart than on shallow, less permeable soils having the same degree of slope, as there normally will be less runoff on them than on the more impervious soil. Terraces can be used on slopes up to even 10 or 12 percent if the soils are very pervious, and more valuable moisture can be conserved than through the use of grade ditches.

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When the expansion program of the CCC is completed, a total of 112,000 men and 542 camps will be engaged in erosion control work under the direction of the Soil Conservation Service.

CCC GRADS FIND JOBS EASIER TO GET, DUE TO TRAINING

An interesting development of the CCC experiment is revealed in a recent article by Stanley Carroll, Universal Service Correspondent, Washington, D.C., in which he states that after the release of 110,000 boys from the camps at the end of the first six months, 18,000 found jobs almost immediately. In the second group discharged 40,326 of the 150,000 released found work at once. In the third six months period 58,000 withdrew from the camps to accept positions. In the vast majority of cases Mr. Carroll states that the boys found jobs in work for which they had no training, until they went to the CCC camps. The combination of forestry training, army discipline and educational facilities provided by the government has made responsible men out of thousands of boys who formerly roamed the streets of the cities, or who lived a nomad life in the "jungles." - - - From "Conservation Activities" - June 1935, Conservation Association, Los Angeles County.

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TRAINING IN SOIL EROSION CONTROL OFFERED CCC ENROLLEES

Instruction in soil erosion control will be offered enrollees in every Civilian Conservation Corps camp in the country as part of the CCC program to reduce the huge damages caused annually by soil wastage, Robert Fechner, director of Emergency Conservation Work recently announced.

Outlines of study, prepared by the Office of Education and the Soil Conservation Service, have been submitted to the War Department, which is responsible for the administration of the general education program. Instruction will be supervised for the most part by the educational advisors in the camps. Wherever possible classes will be conducted by erosion control specialists regularly attached to the demonstration projects of the Service.

"The prime purpose of the course is to give enrollees a rudimentary working knowledge of erosion control technique", H. H. Bennett, Chief of the Soil Conservation Service said today in commenting upon the program. "No attempt will be made to produce specialists within the few months the lessons will be offered. Many of these boys will return to farm homes after their enrollment expires. This training will give them a foundation for erosion control work to conserve the soil on their own land. Furthermore, many of them will be sufficiently interested to carry on study of the technique of soil conservation which, unfortunately, is something all too few understand."

Enrollees working in erosion control areas have been given instructions by specialists of the Service during the past fiscal year.

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More than 46,000 Civilian Conservation Corps enrollees are now actively engaged in the national campaign against soil erosion.

